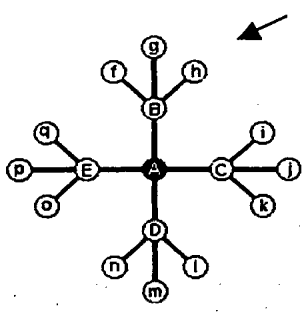

Figure 1a

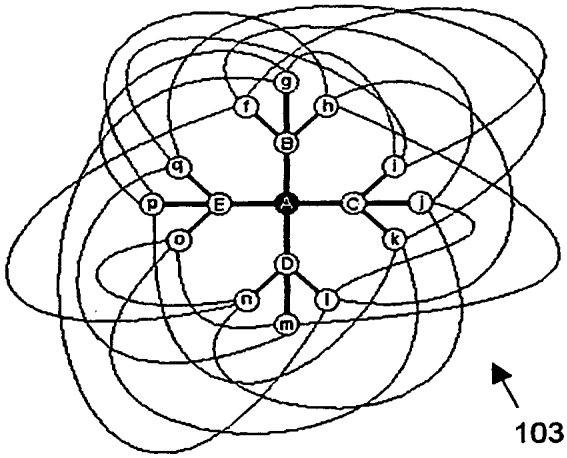

Figure 1b

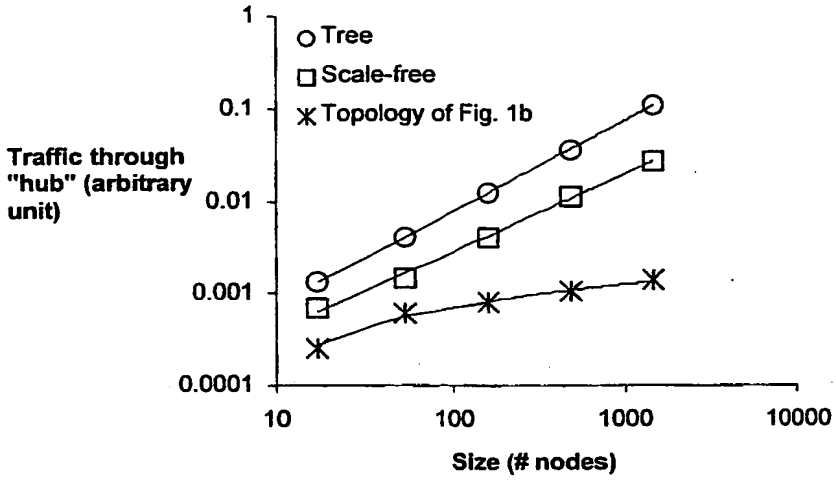
1
0.1
0.01
0.001
0.0001
Traffic through "hub" (arbitrary unit)
Tree
Scale-free
Topology of Fig. 1b
10
100
1000
10000
Size (# nodes)

Figure 2

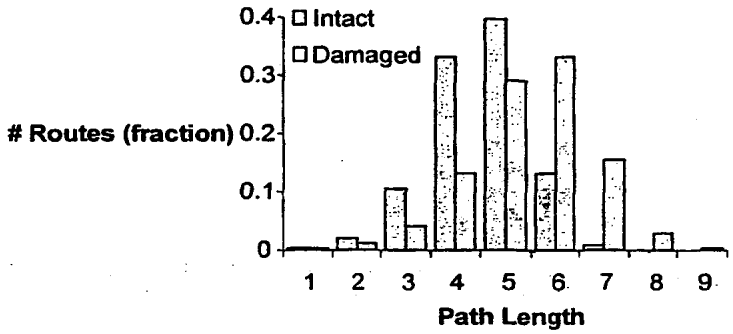

Figure 3a

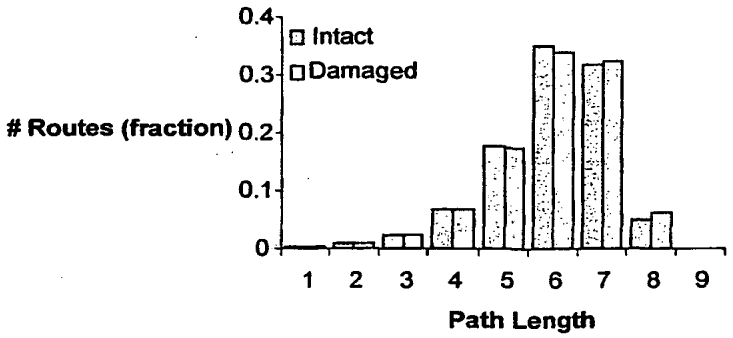

Figure 3b

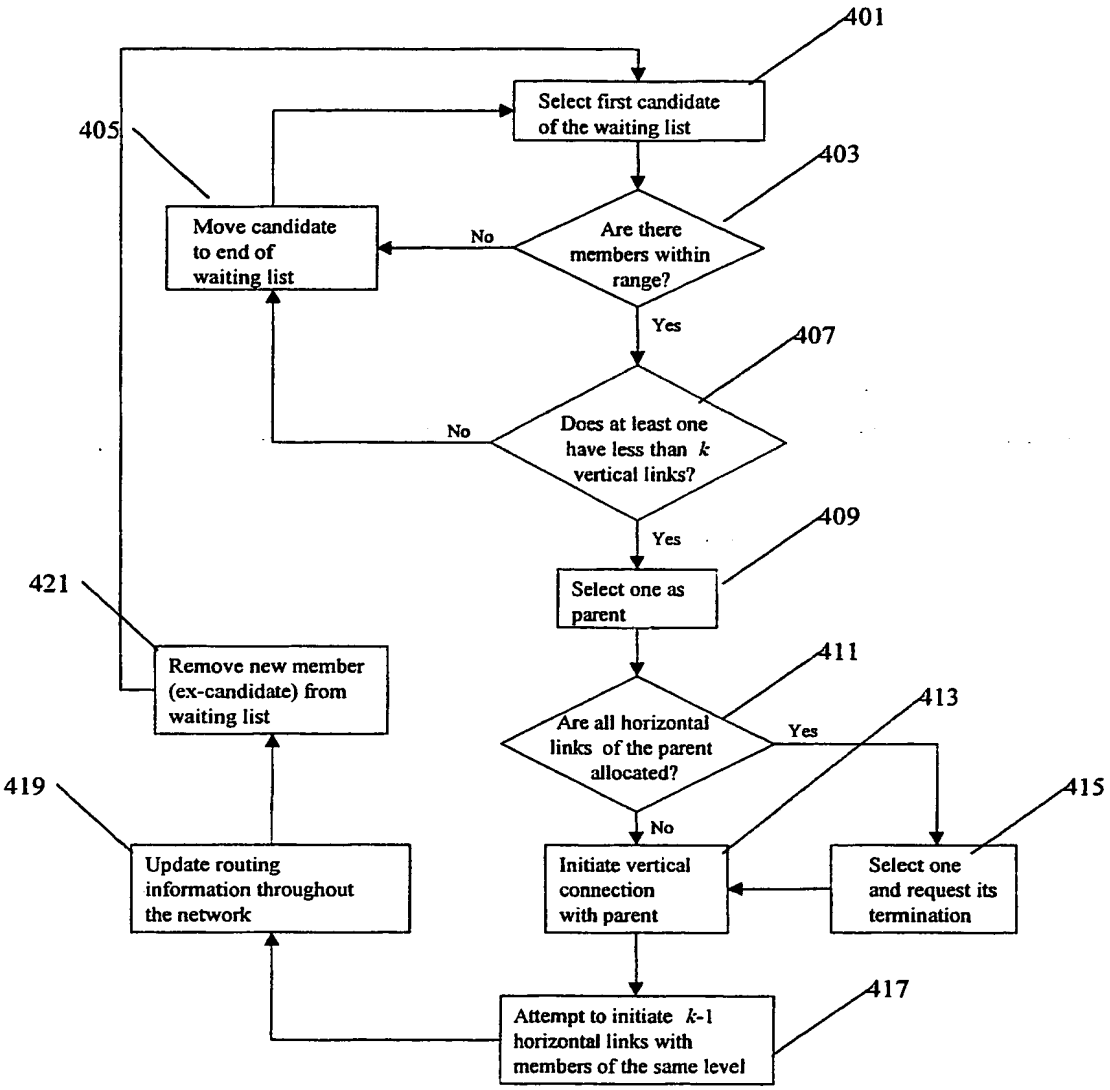
401
Select first candidate of the waiting list
403
Are there members within range?
No
405
Move candidate to end of waiting list
Yes
407
Does at least one have less than k vertical links?
No
Yes
409
Select one as parent
411
Are all horizontal links of the parent allocated?
Yes
413
No
415
Select one and request its termination
Initiate vertical connection with parent
417
Attempt to initiate k-1 horizontal links with members of the same level
419
Update routing information throughout the network
421
Remove new member (ex-candidate) from waiting list

Figure 4

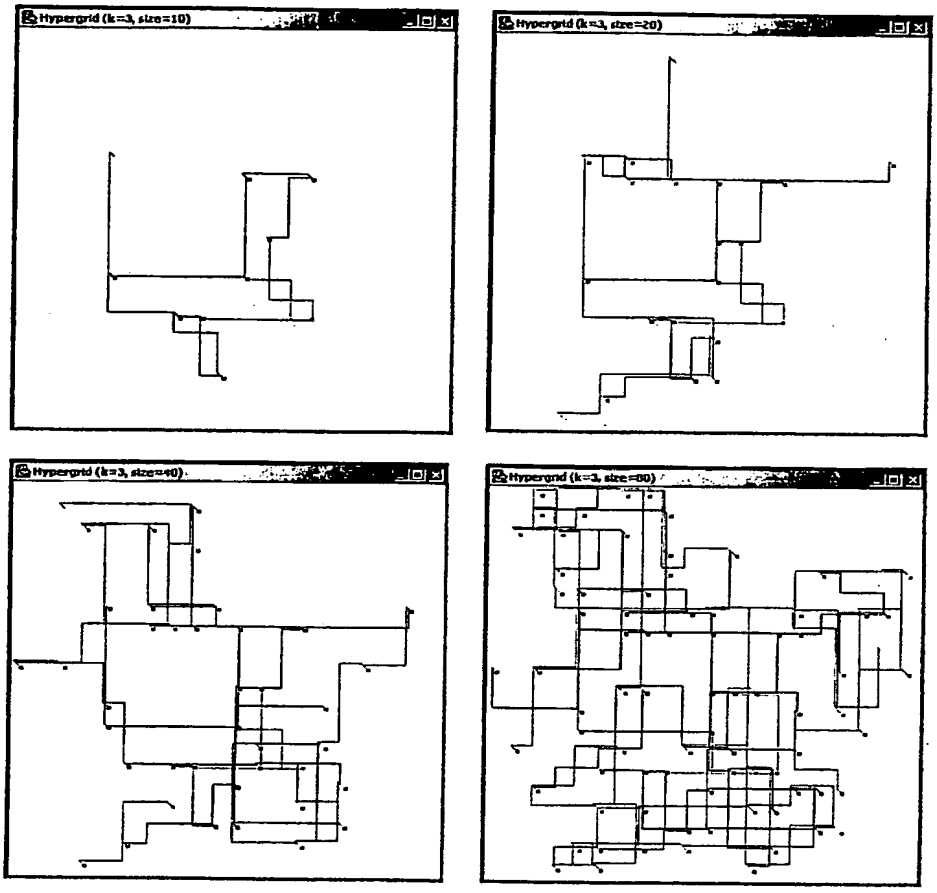
Hypergrid (k=3, size=10)
Hypergrid (k=3, size=20)
Hypergrid (k=3, size=40)
Hypergrid (k=3, size=80)

Figure 5

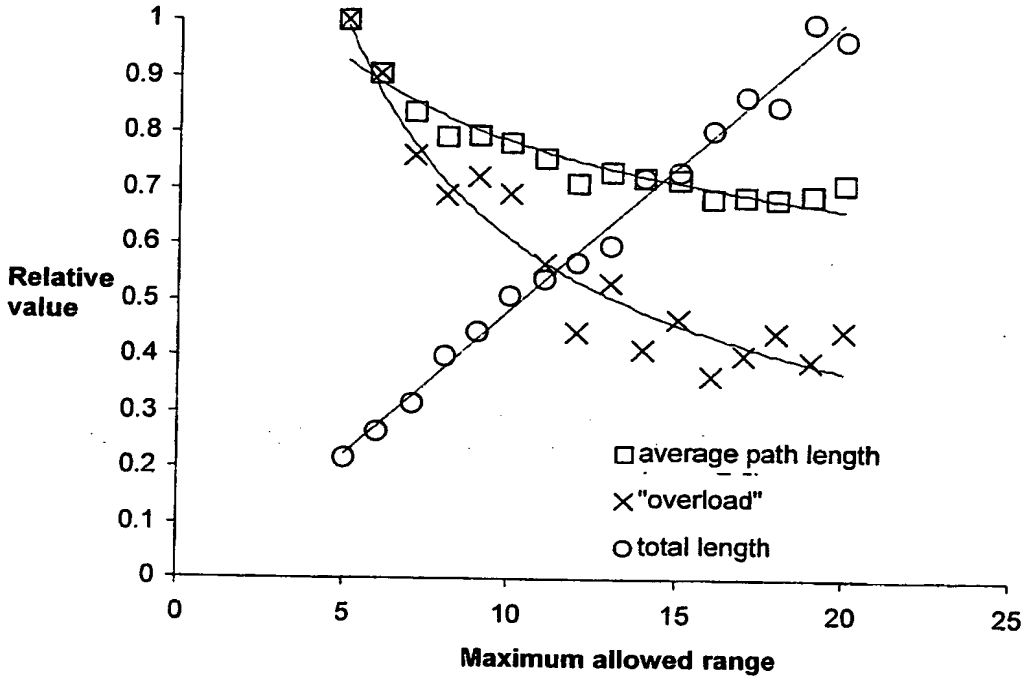
Relative value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
15
20
25
Maximum allowed range
average path length
"overload"
total length

Figure 6

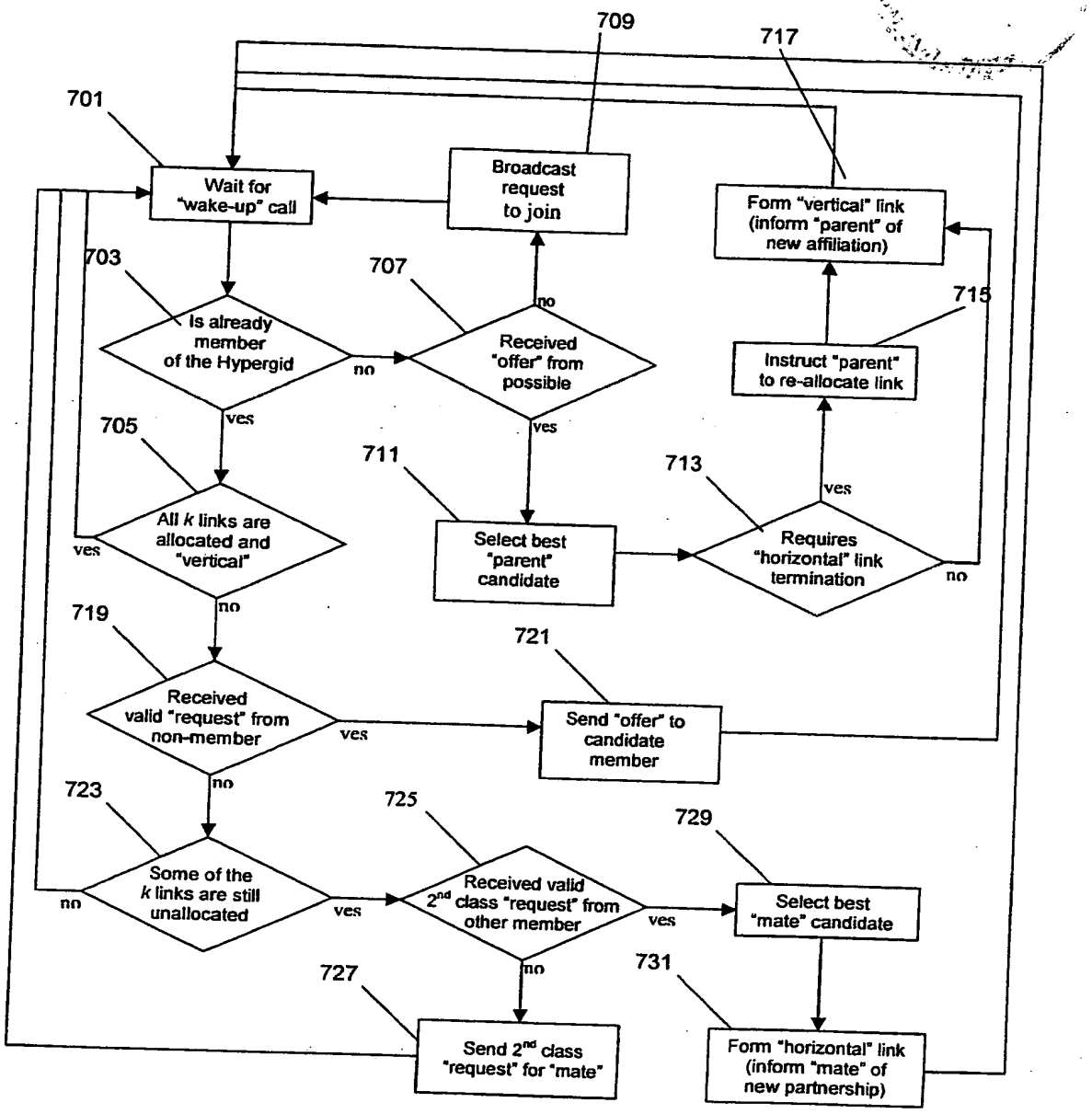
709
717
701
Wait for "wake-up" call
Broadcast request to join
Form "vertical" link (inform "parent" of new affiliation)
703
Is already member of the Hypergid
no
707
Received "offer" from possible
no
715
Instruct "parent" to re-allocate link
yes
yes
705
All k links are allocated and "vertical"
yes
711
Select best "parent" candidate
713
Requires "horizontal" link termination
yes
no
no
719
Received valid "request" from non-member
yes
721
Send "offer" to candidate member
no
723
Some of the k links are still unallocated
no
yes
725
Received valid 2nd class "request" from other member
yes
729
Select best "mate" candidate
no
727
Send 2nd class "request" for "mate"
731
Form "horizontal" link (inform "mate" of new partnership)

Figure 7